

Version:  
January 11, 2017



# Filter Terminologies

## **Token Electronics Industry Co., Ltd.**

**Taiwan:** No.137, Sec. 1, Zhongxing Rd., Wugu District,  
New Taipei City, Taiwan, R.O.C. 24872  
Tel: +886 2981 0109 Fax: +886 2988 7487

**China:** 12F, Zhong Xing Industry Bld., Chuang Ye Road,  
Nan Shan District, Shen Zhen City,  
Guang Dong, China 518054  
Tel: +86 755 26055363; Fax: +86 755 26055365

[Web: www.token.com.tw](http://www.token.com.tw)

[Email: rfq@token.com.tw](mailto:rfq@token.com.tw)



## ▶ Filter Terminologies

### Characteristics and Properties of Filter Terminologies

#### What is "Ceramic Filter"?

A filter which uses a piezoelectric ceramics as an electrical-mechanical transducer and as a mechanical resonator. It provides simultaneously the electrical and the mechanical system within a single element.

#### Filter Characteristic Properties

##### Center Frequency (Symbol: $f_0$ ; Unit: Hz)

It signifies the frequency in the center of the pass band width. However, the center frequency for some product is expressed at the point where the loss is minimum.

##### Pass Band Width (Symbol: PBW; Unit: Hz)

Signifies a difference between the two frequencies where the attenuation becomes 3dB from the level of the minimum loss point.

##### Insertion Loss (Symbol: IL; Unit: dB)

Expressed in the input and output level ratio at the point of minimum loss in dB. The insertion loss for some product is expressed in the input and output level ratio at the center frequency.

##### Ripple (Unit: dB)

If there are peaks and valleys in a pass band width, the ripple expressed the level difference of voltage between the maximum peak and minimum valley and it is expressed in dB.

##### Attenuation Band Width (Symbol: ABW; Unit: Hz)

Signifies a difference between the two frequencies where the attenuation becomes the specified values (dB) from the level of minimum loss.

(Example: Expressed at a point where the attenuation becomes 20 dB in case of 10.7 MHz filter.)

##### Selectivity (Unit: dB)

Expressed as the attenuation of the detuning point from the center frequency.

(Example: The attenuation that  $\pm 9$  kHz was detuned from the center frequency in case of 455 kHz filter.)

##### Spurious Response (Symbol: sp; Unit: dB)

Expressed as the difference of voltage ratio between minimum attenuation point in the stop band range and minimum loss point in the pass band width by using dB (The stopped range is specified with each filter).

##### Spurious

Signifies the frequency response based on the parasitic (unwanted) vibration against the frequency except the fundamental vibration.

##### Bottom Level (Unit: dB)

Signifies the minimum or average attenuation without both main response and spurious within the specified frequency range.

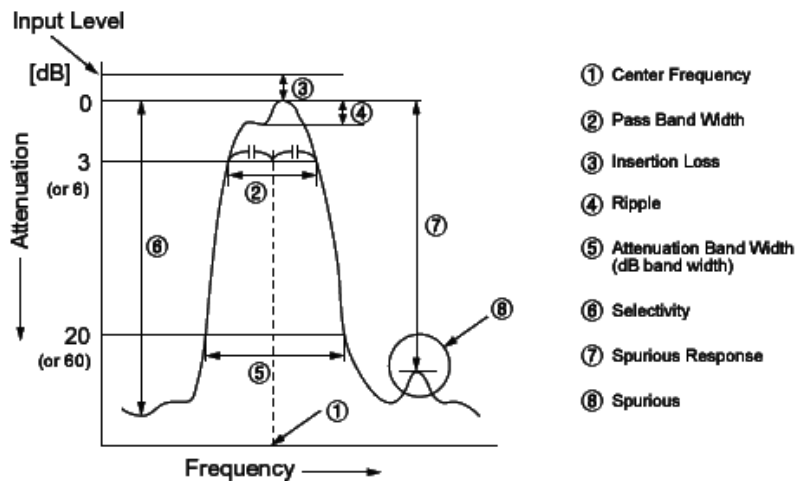
## Input/Output Impedance (Unit: $\Omega$ )

Signifies the internal impedance value of the input and output side at the center frequency of ceramic piezoelectricity, and it is expressed in  $\Omega$ . It causes no problem even if the input and the output are used in reverse with ceramic piezoelectricity, since the input and the output impedance are in symmetry of substantially almost same value.

## Impedance Matching

When connecting one electric circuit to another, or a component to another, or one electric circuit to a component, the electric energy is supplied most efficiently from the signal source to the load if the signal source impedance and the load impedance are same.

If these impedances are mismatched, electric energy escapes in form of a reflection. To match the signal source impedance and the load impedance is called the impedance matching. This is very important for ceramic piezoelectricity, as an improper impedance matching may cause various troubles.



An example of filter Frequency characteristic